Russian Journal of Numerical Analysis and Mathematical Modelling 2015 vol.30 N1, pages 43-54

Easily implementable iterative methods for variational inequalities with nonlinear diffusion-convection operator and constraints to the gradient of solution

Laitinen E., Lapin A., Lapin S.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2015, walter de gruyter gmbh. All rights reserved. New iterative solution methods are proposed for the finite element approximation of a class of variational inequalities with nonlinear diffusion-convection operator and constraints to the gradient of solution. Implementation of every iteration of these methods reduces to the solution of a system of linear equations and a set of two-dimensional minimization problems. Convergence is proved by the application of a general result on the convergence of the iterative methods for a nonlinear constrained saddle point problem.

http://dx.doi.org/10.1515/rnam-2015-0005

Keywords

Constrained saddle point problem, Finite element method, Iterative method, Variational inequality